Kabin Xie, Ph. D

College of Plant Sciences and Technology
Huazhong Agricultural University
Wuhan, Hubei 430070, China
Email: kabinxie@mail.hzau.edu.cn

EDUCATION AND WORK EXPERIENCE

- 2015.03-Present
  Professor, College of Plant Sciences aa e e Š ←

in developing rice cultivars with enhanced tolerance to biotic and abiotic stresses by genetic engineering. Using rice as a model organism, I am trying to dissect how plants use protein kinases to transmit environmental threats to proper cellular response to survival. My current study focuses on functional analysis of several pivotal protein kinase families, including CDPK and MAPK. Precise manipulating the activity of these protein kinases to reprogram stress signaling pathways may provide new approaches to increase crop production under abiotic/biotic stressed environments.

I am also developing and utilizing CRISPR/Cas9-mediated genome editing tools for crop genetic improvement. As the most promising method in genome manipulation, the CRISPR/Cas9 system provides a high-efficient approach to manipulate genomic sequences. I am creating novel CRISPR/Cas9 toolkits with high capability for crop genome engineering like genome editing, epigenome editing, chromosomal fragment deletion and transcriptional regulation. In addition to creating CRISPR/Cas9 toolkits for variable applications, my future work will also focus on creating more sophisticated CRISPR/Cas9 platform for high-throughput genetic manipulation in plants and developing new disease resistant cultivars by manipulating crop genomes using these CRISPR/Cas9 tools.

PUBLICATIONS

Peer Reviewed Journals:

1. Zhang YM, Zhang Y, **Xie K**(#). Evaluation of CRISPR/Cas12a based DNA detection for fast pathogen diagnosis and GMO test in rice. **Mol Breeding** 2020, DOI: 10.1007/s11032-019-1092-2
2. Pu X, Liu L, Li P, Huo H, Dong X, **Xie K**, Yang H, Liu L A CRISPR/LbCas12a-based method for highly efficient multiplex gene editing in *Physcomitrella patens*. **Plant J** (2019) 100 (4):863-872. doi:10.1111/tpj.14478
1. **Xie K**(#), Guo L, Bai Y, Liu W, Yan J, Bucher M(#). Microbiomics and Plant Health: An Interdisciplinary and International Workshop on the Plant Microbiome. ***Mol Plant***, 2019, 12(1): 1-3. doi: 10.1016/j.molp.2018.11.004. (meeting report)
2. Minkenberg B, Zhang J, **Xie K**, Yang Y. CRISPR-PLANT v2: an online resource for highly specific guide RNA spacers based on improved off-target analysis. ***Plant Biotechnol J***, 2019, 17:5-8. doi: 10.1111/pbi.13025.
3. Dan Ding, Kaiyuan Chen, Yuedan Chen, Hong Li, and **Kabin Xie** (#), Engineering introns to express RNA guides for Cas9- and Cpf1-mediated multiplex genome editing. ***Mol Plant***. 2018, 11(4):542-552.
4. Yang Yang, Kaiyu Zhu, Huailin Li, Shaoqing Han, Qingwei Meng, Shahid Ullah Khan, Chuchuan Fan, **Kabin Xie**, Yongming Zhou. Precise editing of *CLAVATA*

genes in Brassica napus L. regulates multilocular silique development. ***Plant Biotech J***. 2018, 16(7):1322-1335. DOI: 10.1111/pbi.12872.

5. Jianqiang Shen, Juhong Liu, **Kabin Xie**, Feng Xing, Fang Xiong, Jinghua Xiao, Xianghua Li and Lizhong Xiong (#), Translational repression by a miniature inverted-repeat transposable element in the 3’ untranslated region. ***Nat Commun***. 2017, (17)14651, DOI: doi:10.1038/ncomms14651.
6. Hao Liu, Yuduan Ding, Yanqing Zhou, Wenqi Jin, **Kabin Xie** (#), Ling-Ling Chen (#). CRISPR-P 2.0: an improved CRISPR-Cas9 tool for genome editing in plants. ***Mol Plant***. 2017, 10(3): 530-532 (IF: 6.1, # co-corresponding author)
7. Fengping Dong(*), **Kabin Xie**(*), Yueying Chen, Yinong Yang, Yingwei Mao. Polycistronic tRNA and CRISPR guide-RNA enables highly efficient multiplexed genome engineering in human cells. ***BBRC*** . 2017, 482(4): 889-895 (* equal contribution)
8. Bastian Minkenberg, **Kabin Xie**, Yinong Yang. Discovery of rice essential genes by characterizing CRISPR-edited mutation of closely related rice MAP kinase genes. ***Plant J***, 2017, 89(3): 636-648.
9. Yuduan Ding, Hong Li, Ling-Ling Chen (#) and **Kabin Xie** (#). Recent advances in genome editing using CRISPR/Cas9. Front. Plant Sci. 2016, 7:703.
10. **Kabin Xie**, Bastian Minkenberg and Yinong Yang. 2015. Boosting CRISPR/Cas9 multiplex editing capability with the endogenous tRNA-processing system. ***PNAS.*** 112(11): 3570-3575.
11. **Kabin Xie**, Jianping Chen, Qin Wang, Yinong Yang. 2014. Direct phosphorylation and activation of a mitogen-activated protein kinase by a calcium-dependent protein kinase. ***Plant Cell.*** 26(7): 3077-3089.
12. **Kabin Xie,** Jianwei Zhang and Yinong Yang. 2014. Genome-wide prediction of highly specific guide RNA spacers for the CRISPR-Cas9-mediated genome editing in model plants and major crops. ***Mol Plant.***7(5): 923-926.
13. Yujie Fang, **Kabin Xie,** Lizhong Xiong. 2014. Conserved miR164-targeted NAC genes negatively regulate drought resistance in rice. ***J. Exp. Bot.*** 65 (8): 2119-2135.
14. **Kabin Xie** and Yinong Yang. 2013. RNA-guided genome editing in plants using a CRISPR-Cas system. ***Mol Plant.*** 6(6):1975-1983. (cover story)
15. **Kabin Xie**, Jianqiang Shen, Xin Hou, Jialing Yao, Xianghua Li, Jinghua Xiao, Lizhong Xiong. 2012. Gradual increase of miR156 regulates temporal expression changes of numerous genes during leaf development in rice. ***Plant Physiol***. 158(3):1382-94.
16. Jianqiang Shen, **Kabin Xie**, Lizhong Xiong. 2010. Global expression profiling of rice microRNAs by one-tube stem-loop reverse transcription quantitative PCR revealed important roles of microRNAs in abiotic stress responses. ***Molecular***

Genetics and Genomics. 284(6):477-88. (co-first author)

17. Yujie Fang, **Kabin Xie**, Xin Hou, Honghong Hu, Lizhong Xiong. 2010. Systematic analysis of GT factor family of rice reveals a novel subfamily involved in stress responses. ***Molecular Genetics and Genomics***. 283(2):157-69.
18. Xin Hou, **Kabin Xie**, Jialing Yao, Zhuyun Qi, and Lizhong Xiong. 2009. A homolog of human ski-interacting protein in rice positively regulates cell viability and stress tolerance. ***PNAS*** 106(15): 6410-6415.
19. Xipeng Ding, Xin Hou, **Kabin Xie**, Lizhong Xiong. 2009. Genome-wide identification of BURP domain-containing genes in rice reveals a gene family with diverse structures and responses to abiotic stresses. ***Planta.*** 230(1):149-63.
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22. **Kabin Xie**, Congqing Wu, Lizhong Xiong. 2006. Genomic organization, differential expression, and interaction of SQUAMOSA promoter-binding-like transcription factors and microRNA156 in rice. ***Plant Physiol***.142(1): 280-293.
23. Congqing Wu, Honghong Hu, Ya Zeng, Dacheng Liang, **Kabin Xie**, Jianwei Zhang, Zhaohui Chu, Lizhong Xiong. 2006. Identification of novel stress-responsive transcription factor genes in rice by cDNA array analysis. ***J Integr Plant Biol***. 48(10): 1216−1224.
24. Jing Ning, Bin Yuan, **Kabin Xie**, Honghong Hu, Congqing Wu, Lizhong Xiong. 2006. Isolation and identification of SA and JA inducible protein kinase gene OsSJMK1 in rice. ***Journal of Genetics and Genomics*** 33 (7): 625-633.
25. **Kabin Xie**, Jianwei Zhang, Yong Xiang, Qi Feng, Bin Han, Zhaohui Chu, Shiping Wang, Qifa Zhang, Lizhong Xiong. 2005. Isolation and annotation of 10828 putative full length cDNAs from indica rice. ***Science in China Series C-Life Sciences***. 48(5):445-451.
26. Jianwei Zhang, Qi Feng, Caoqing Jin, Deyun Qiu, Lida Zhang, **Kabin Xie**, Dejun Yuan, Bin Han, Qifa Zhang, Shiping Wang. 2005. Features of the expressed sequences revealed by a large-scale analysis of ESTs from a normalized cDNA library of the elite indica rice cultivar Minghui 63. ***Plant J***. 42 (5):772-80.

Patent

1. Lizhong Xiong, **Kabin Xie**, and Xin Hou. MIR164 gene that controls plant root

system development and fertility and use thereof. (US20120102598 A1)

2. Yinong Yang and **Kabin Xie.** Molecular method to precisely edit plant genome for non-transgenic genetic engineering. (Provisional patent application serial No. 61/828, 737)
3. Yang, Yinong and Xie, Kabin. 2014. Methods and compositions for RNA-guided multiplex genome editing and other RNA technologies. (US Provisional Patent Application No. 62/065,093)

Book chapter and online protocol

1. **Kabin Xie**, Bastian Minkenberg, and Yinong Yang. 2014. Targeted gene mutation in rice using a CRISPR-Cas9 system. **Bio-protocol** 4(17): e1225. http://www.bio-protocol.org/e1225
2. Wenhua Liu, **Kabin Xie**, and Yinong Yang. 2013. Genomic and bioinformatic resources for rice research. **Methods in Molecular Biology: Rice Protocols** (956): 327-332.

CONFERENCE TALKS (recent five years)

1. Engineering the endogenous RNA processing machinery for CRISPR technology. 18-20 October, 2018. National Congress of Plant Biology, TaiAn, ShanDong, China.
2. A CRISPR/Cas9 Toolbox Based on the Endogenous tRNA Processing. 18-21 August, 2017, The 5th International Conference on Biotic Plant Interactions. Xiamen, Fujian, China.
3. Plant Genome Editing with CRISPR-Cas9, 5-9 August, 2016, Annual Meeting of Chinese Society for Plant Pathology, Nanjing, Jiangshu, China.
4. The CDPK-MAPK Signaling Pathway. 21-24 September, 2015, The 13th International Symposium on Rice Functional Genomics, Wuhan, Invited talk

REFEREE

Lizhong Xiong, Ph.D.
National Key Laboratory for Crop Genetic Improvement,
Huazhong Agricultural University,
Wuhan, 430070
Email: lizhongx@mail.hzau.edu.cn

Yinong Yang, Ph.D
The Penn State Univeristy

405C Life Science Building
University Park, PA 16802
Email: yuy3@psu.edu; Office Phone: 814-867-0324